

Brooklyn Army Supply Base
(Brooklyn Military Ocean Terminal) (Brooklyn Army Terminal)
Opposite the ends of 58th to 64th streets
on Upper New York Bay
Brooklyn
Kings County
New York

HAER No. NY-202

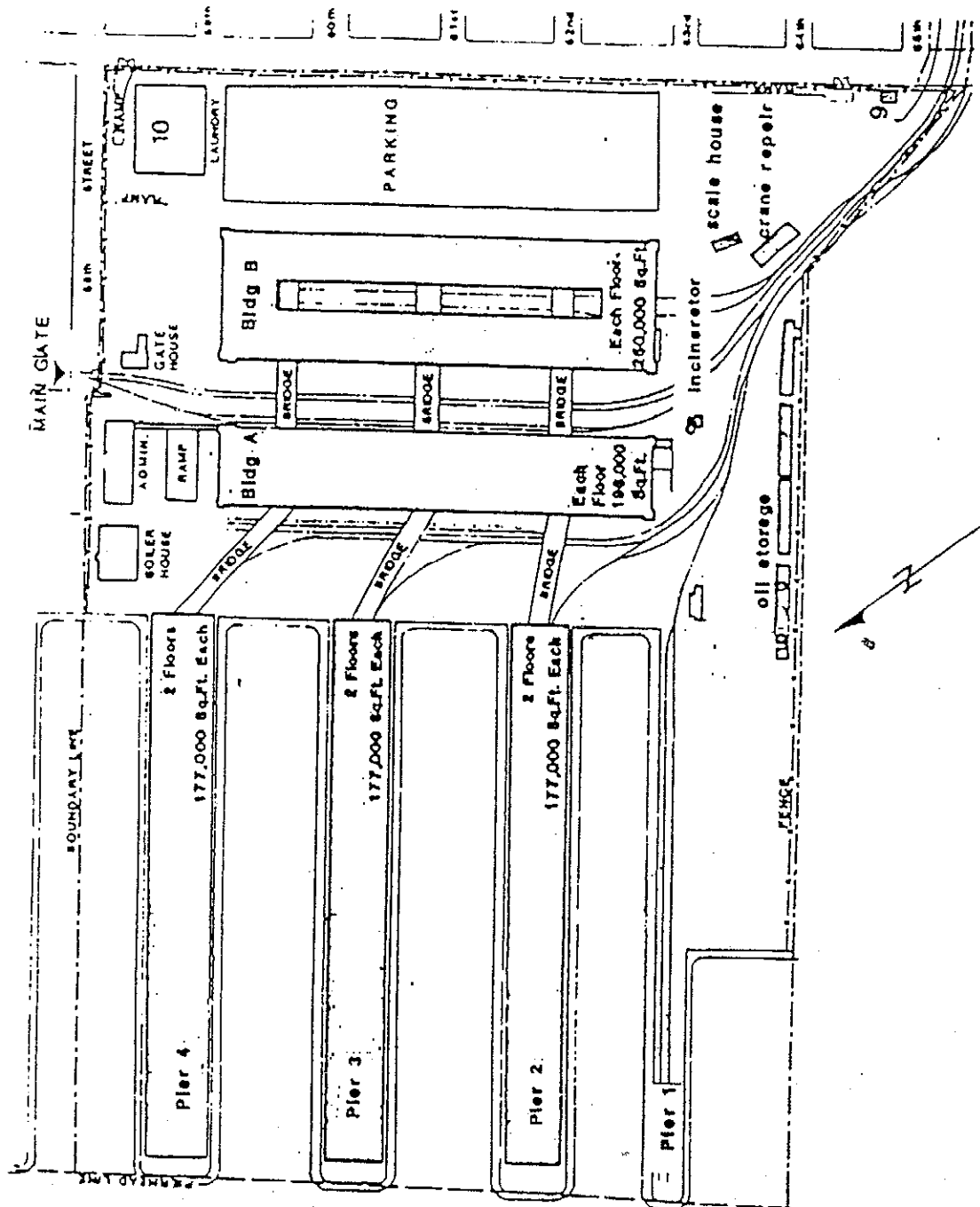
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

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 Key to Photographs



HISTORIC AMERICAN ENGINEERING RECORD

BROOKLYN ARMY SUPPLY BASE
(Brooklyn Military Ocean Terminal)
(Brooklyn Army Terminal)

HAER No. NY-202

Location: On Upper New York Bay, opposite the ends of 58th to 64th streets, Brooklyn, Kings County, New York

USGS Quadrangle: Jersey City, New Jersey - New York

UTM Coordinates: A 18.582060.4500040
B 18.581750.4499670
C 18.582260.4499270
D 18.582310.4499090
E 18.582680.4499550

Dates of Construction: 1918-19

Design Consultant: Irving T. Bush, New York, New York

Architect: Cass Gilbert, New York, New York

General Contractor: Turner Construction Company, New York, New York

Constructing Quarter-
master: Lt. Col. Herbert S. Crocker, Engineering Reserve Corps

Supervising Engineer: A.W. Stephens, Turner Construction Company

Design Engineers: Post & McCord, Brooklyn, New York (Pier 1)
G. Aus & Company (Piers 2-4)

Contractors: Post & McCord, Brooklyn, New York (Pier 1)
George B. Spearin (Pier 2; bulkhead from Pier 3 south)
Henry Steer, Inc. (Piers 3-4; bulkhead from Pier 3
north)

Present owners: New York City Department of Ports and Trade
Battery Maritime Building
New York, NY 10004 (piers)

New York City Public Development Corporation
161 William Street
New York, NY 10038 (upland)

Present use: Parts leased to private firms, parts vacant

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Significance:

The Brooklyn Army Supply Base was erected rapidly in 1918 to meet military overseas shipping demands during World War I. It had the largest storage capacity of the seven supply bases built as part of the same program. Although not completed until after the armistice, the Brooklyn base had a significant role in World War II troop and supply movement. Quartermaster General George W. Goethals had overall responsibility for supply base construction in 1917-18, and directed an effort aimed at providing modern, permanent peacetime waterfront terminals as well as emergency facilities. In Brooklyn, Irving T. Bush made the initial studies for the base, modeled on his own Bush Terminal and municipal plans for waterfront development. Cass Gilbert's massive warehouses attracted international architectural attention, and the waterfront construction of three covered and one open pier included some innovative engineering decisions in the face of wartime steel shortages. All major base components were largely intact in 1988. The base included important new methods for handling waterfront and warehouse traffic, and represents some of the most advanced American shipping terminal designs made before 1920.

Project Information:

The Brooklyn Army Supply Base, also known as the Brooklyn Military Ocean Terminal (BMOT), is listed on the National Register of Historic Places. As part of the New York Harbor Collection and Removal of Drift Project implemented by the Army Corps of Engineers, the outer 619 feet of Pier 1 will (NY-202-A) be removed. This documentation meets conditions for mitigating adverse effects to the base, according to the terms of a Memorandum of Agreement among the Advisory Council on Historic Preservation, the New York State Historic Preservation Officer, and the New York District, Corps of Engineers. Project actions may occur as early as 1989.

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Part I: Historical Information*

A. History and Design of Army Supply Base Waterfront Facilities

1. Overview of the Army Supply Base Program and Design Components

The sudden need for rapid transport of enormous quantities of freight from the United States to Europe during World War I quickly revealed the inadequacy of existing commercial facilities. At both interior and coastal shipping points, there was a lack of terminal warehouse space which encouraged immediate shipment of supplies to port and exacerbated port congestion problems. Commandeering the few developed terminals, such as Bush terminal in South Brooklyn, was insufficient for Army planners. The Army's principal objective was the creation of new storage facilities to act as reservoirs for the orderly movement of freight, with the stockpiling of one month's supply of matériel in the interior used as the yardstick for storage space development. Given the perceived lack of modern American port terminal facilities, Quartermaster General George W. Goethals -- the Brooklyn-born chief engineer for the Panama Canal, then directing the Army's Purchase, Storage, and Traffic (PS&T) Division -- believed that building permanent structures would add relatively little to supply base costs while adding greatly to the nation's future commercial growth. The ensuing permanent construction became the most advanced program of terminal development in the United States, and in magnitude was the most ambitious such program then on record in the world. Supply bases arose with remarkable speed at the ports of New York, Boston, Philadelphia, Norfolk, Charleston, and New Orleans beginning in the spring of 1918, but most remained somewhat unfinished by the November armistice. A supply base at Newark, quickly erected in 1917 to enlarge an earlier municipal terminal, made the Port of New York the only one with two Army terminals, reflecting the region's importance in national planning. The completed terminals, lacking in some originally planned details, thus generally never served their intended purpose of rapid shipment overseas until World War II: most of the terminals were first used as troop and freight receiving points after World War I (Crocker 1919: 1-2; MacElwee 1926: 278-80).

The relative novelty of large storage terminals in American ports, and the apparent lack of any detailed studies of theoretical or existing facilities for general terminal designs, made the supply base program explicitly experimental, with varied base designs. Goethals evidently hoped to use terminal performance data as a comparative base for future commercial projects. MacElwee emphasized this deliberate variability when he made the first such comparisons -- without the data base, forgotten in the "return to normalcy" -- and found wide theoretical differences in handling efficiency among the bases (1926: 211-14, 253-56, 281-300).** The Brooklyn base history, along with some

* Capitalized references are to photographs in this documentation.

** MacElwee wrote shortly after the post-war shipping depression, and had little real data on supply base performance for military or commercial use.

of MacElwee's remarks on other bases, suggest that much of the variation derived from local port conditions rather than an arbitrary assortment of possible arrangements. These conditions included the location and size of undeveloped waterfront properties, offshore depths relative to dredging requirements, availability of rail links, upland subsurface restraints on warehouse construction, and the design preferences and expertise of the men involved in the rapid planning of the bases.

There is no published analysis of supply base design considerations, although official documents such as Crocker's report on the Brooklyn site (1919) probably exist and would allow for some comparison. Committees of PS&T staff and advisors did much of the planning, but for the Brooklyn base Irving T. Bush had the major role prior to final design (Crocker 1919: 3). Bush's extremely successful private terminal in Brooklyn was a model for waterfront development in this period, as discussed below. His wartime appointments as Chief Executive Officer of the War Board of the Port of New York, and Chief of Embarkation for the War Department, reflected his influence (Crocker 1919: 3). The collective array of base plans (Figures 2 and 3) suggests that on sites with no size or subsurface restrictions, Army base planners preferred multi-story warehouses parallel to multi-story wharf sheds, so as to minimize trucking distances within or between buildings. The Boston and, to a lesser extent, Philadelphia bases come closest to this design. All the supply bases except those at Norfolk and Brooklyn included quay or marginal wharf berths, and where structurally feasible (Boston, Philadelphia, and New Orleans), multi-story transit sheds parallel to the wharf. Local conditions restricted the use and arrangement of transit and warehouse space at most bases. Marshland sites at Newark, Norfolk, and Charleston, selected in the absence of better sites in already developed ports, limited all sheds or warehouses to a single story. Subsurface limitations at New Orleans led to warehouse placement perpendicular to the bulkhead, while at Brooklyn spatial constraints seem to have dictated placement of one warehouse behind another parallel to a narrow bulkhead. Piers at Brooklyn and Norfolk increased berth-ing space, but generally increased both dredging needs and trucking distances. The Brooklyn Army Base, while actually having the shortest trucking distances, also had narrow piers which sacrificed working deck space and required more frequent railroad car setting (MacElwee 1926: 211-14, 281-300).

2. Brooklyn Army Base Design and the Port of New York

The principal elements of the Brooklyn base design were one open pier and three piers with two story sheds along about 1350 feet of bulkhead, two eight-story warehouses parallel to the bulkhead and each other, a boiler house, an administration building, machine shop and garages, storage yards and trucking areas. Transportation facilities included rail yards, and rail links to both the adjacent Long Island Railroad (LIRR) yard and float bridges to the south, and to Bush Terminal to the north (Figures 1 and 4). Each pier is about 1300 feet long. Warehouse A is 200 by 980 feet, and Warehouse B is 306 by 980 feet with a skylight-covered interior court in which cranes once unloaded material to different floors. The second floor of each transit shed joined the third floor of Warehouse A, via a steel truss bridge with reinforced concrete deck,

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roof, and sides. The pier bridges aligned with the bridges over First Avenue connecting the two warehouses, so as to form complete lines of traffic for freight movement. A second line of traffic included the space between Warehouse A and the water, and tunnels between the warehouses. The overall design was oriented towards rapid wartime receipt of freight by truck or rail, and the simultaneous, uninterrupted loading of European-bound vessels (Crocker 1919: 10, 56; Engineering News-Record 1919).

In storage capacity Brooklyn's was by far the largest of the supply bases, with two to three times the warehouse space of any other, and three to five times the berthing space of all except the Norfolk terminal. The warehouses have over 3.5 million square feet. Original plans, reduced in scope prior to construction, called for Warehouse B to be twice its final size. This intensive development occurred on what was by no means the largest supply base site. The Brooklyn Army Base, although sharing some newly-introduced elements with other bases -- such as bridges between upper pier levels and multi-storied warehouses, centrally controlled and self levelling warehouse elevators, and an extensive use of concrete -- differed significantly from the others in ways which reflect its siting and planning origins in the Port of New York.

Brooklyn Army Base's final design, along with remarks by Crocker (1919: 8), suggest two primary concerns in base siting: construction of large multi-story warehouses near ship channels, and use of existing rail connections. In the Port of New York of 1917, there were few undeveloped sites with both adequate subsurface conditions and existing rail links. Intended as the main point of matériel shipment, the base required land suitable for foundations of such warehouses. This consideration precluded expeditious use of large, undeveloped marsh or shoal areas such as Newark Bay, or Upper New York Bay between Jersey City and Bayonne. The extensive filling and dredging required to develop such areas made them undesirable in an emergency context. Aside from subsurface problems, the plethora of railroads entering the port -- most of them between Jersey City and Edgewater -- and the lack of a complete belt line linking their terminals made virtually any site in New Jersey unsuitable. Base planners believed the cost of railcar transfers by water from the many New Jersey terminals to a New Jersey base exceeded analogous carfloat costs from all these points to a New York base. On the New York side, there were no available sites north of Bush Terminal. Rail links may have precluded a Staten Island site; discussion of this possibility is not documented.

Perhaps more important for final siting and design, the New York City Department of Docks and Ferries plans for South Brooklyn already included a terminal immediately north of the LIRR Bay Ridge yards with a waterfront strikingly similar to later Brooklyn Army Base arrangements (Figure 5). The municipal plans, first proposed in 1906, drew on the successful private development of Bush Terminal, with its nearly 200 acres of piers, factories, warehouses, and rail connections between 36th and 51st streets, begun in 1895. Bush Terminal was the largest multi-tenant industrial property in the United States by World

War I, and offered integrated manufacturing, warehousing, and transportation services. The Bush Terminal Railroad was critical in providing rail links to other American lines, via transfer bridges at 51st Street and at the LIRR yards at 65th Street. Transfer bridges facilitated freight car movement across the harbor, and eliminated Brooklyn's relative isolation from major rail connections made through the port in New Jersey, Manhattan, and the Bronx. Bush's railroad also included a marginal system linking over 1.5 miles of South Brooklyn waterfront between 29th and 54th streets. The terminal and its rail system were an important stimulus for local industry and urban growth (Raber et al. 1985: 26; Flagg and Raber 1986).

Recognizing the potential for South Brooklyn development in port planning, the city's Department of Docks and Ferries proposed new steamship facilities north and south of Bush Terminal, envisioning the 'municipalization' of the Brooklyn waterfront with modern piers backed by warehouses and served by rail connections. By creating new freight terminals in Brooklyn, department planners hoped to relieve congestion at the extremely crowded shipping terminals on Manhattan's West Side. Although the department completed only part of the 1906 plan, the proposal was an important model for later public and private development, acting as a legal template for private builders and greatly influencing projects such as the Army Supply Base (New York City Department of Docks and Ferries 1911, 1912; Raber et al. 1985: 26).

Brooklyn Army Base pier dimensions, slips, and bulkhead lines follow the earlier New York City outline, suggesting that conformity with larger South Brooklyn waterfront plans was a major factor in terminal planning. The Army in some ways simply completed a segment of the city's design. As noted below, most of the 1917 waterfront here was relatively undeveloped, allowing rapid construction, in contrast to all other frontage north of the LIRR yards. The area chosen allowed for use of Bush Terminal and its marginal railroad to receive and transfer ship-borne freight without disrupting loading of war-bound ships, and for use of the new LIRR transfer bridges (built 1917) and yard to receive freight arriving on any regional railroad, at a site with generally adequate subsurface conditions. The LIRR facilities made Brooklyn Army Base transfer bridge construction less pressing during the emergency program, and despite plans for three bridges the terminal had none until the 1980s. Use of this site gave the Brooklyn Army Base the shortest waterfront of the Army supply bases, about 1570 feet including the area south of Pier 1.

Both Irving Bush and the Department of Docks and Ferries influenced Brooklyn Army Base construction and design. In substructure, dimensions, and siting, all terminal piers reflected fifteen years of the Department's building programs, and gradual development of all-concrete decks on wooden substructures. Bush's paramount role in base design appears in the arrangement of warehouses parallel to the bulkhead, the double tracks on each pier deck, and the placement of proposed transfer bridge facilities at one end of the terminal's line of piers. The two Army Base warehouses may have been intended for somewhat different functions, with waterside A to be used for in-transit storage and larger B planned for warehousing. Bush was probably the first regional terminal builder to include both these functions on one waterfront site.

Pier 1, nearest the LIRR yards, differed from wider, covered piers 2-4 in form and intended function. Pier 1's open, much thicker deck was designed for lighterage transfers of freight too large or heavy to handle conveniently through a covered pier (e.g., tanks). Such freight would usually arrive in flatcars or gondolas (freight cars with sides and ends but no roof). Original Army Base designs called for gantry cranes on Pier 1 for heavy freight movement, although as noted below these were not installed until World War II.

Except for minor innovations in piershed construction due to wartime conditions, the Brooklyn Army Base waterfront seems primarily a product of local influence. In contrast, the new warehouses included dramatic new elements not previously seen in this port. The traveling shop crane and loading balconies in Warehouse B's atrium — probably derived in part from existing Ford Motor Company plant arrangements — along with the elaborate new elevator system and the two levels of traffic for loading and unloading ships, appear to have no regional precedents. Cass Gilbert, designer of the Woolworth Building and the U.S. Custom House in Manhattan, and later of the U.S. Supreme Court building in Washington, served as terminal architect. His stark, monumental warehouse designs drew praise from proponents of international modernist style. The warehouses were in 1919 the largest reinforced concrete structures in the world. Gilbert's responsibility for more than the exteriors and massing of the warehouses, and for the arrangement and appearance of the new freight handling facilities, remains unclear, however. The Army bases encompassed major freight handling innovations requiring large teams of planners and engineers (Crocker 1919; Engineering News-Record 1919; MacElwee 1926: 299- 300; New York State Office of Parks, Recreation, and Historic Preservation 1983).

3. Construction of the Brooklyn Army Base

a. The Building Site in 1917

The government commandeered 97 acres to build the Brooklyn Army Base, from Second Avenue to the pierhead line and from 58th to 64th streets. North of 63rd Street, this area included a sloping, more or less natural shoreline between about 240 and 530 feet west of First Avenue, and landfill between First and Second Avenues bringing the surface to about 10 feet above mean high water. Most of the property east of First Avenue was apparently vacant, except for a dozen frame tenements off Second Avenue between 58th and 59th streets. The pre-Army Base waterfront west of First Avenue, and north of 62nd Street, included perhaps 10 frame buildings and 3 small wood piers associated with the Bay Ridge or American Model Yacht Club, several small boat building shops, and a bathing beach. The Morse Dry Dock and Repair Company had a small yard with several small wood piers or trestles between 62nd and 63rd streets, on the southern edge of the open, unbulkheaded shore. Aside from the concrete 'castle' of Henry Kent, which stood somewhere on the Brooklyn Army Base site from 1855 to 1901, there were no other known historic developments on the property north of 63rd Street. The Army Base bulkhead on this frontage is 547 feet west of First Avenue, well west of all earlier sites except the Morse yard, whose frame features disappeared during Brooklyn Army Base construction (Hyde 1917; Crocker 1919: 7 and Appendix B).

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Between 63rd and 64th streets, the Brooklyn Army Base site just prior to construction was a Brooklyn Rapid Transit Company (BRT) freight yard. A wood pier and single ferry rack on the north edge extended to the pierhead line from a point about 720 feet west of First Avenue, adjacent to a slip 90 feet wide. The south edge of this yard, abutting the LIRR 64th Street Pier, was originally a wood pier over a trunk sewer, extending to a point about 1300 feet west of First Avenue and converted to a wharf by 1917 through the attachment of the south side of the pier to the bulkhead immediately adjacent to the 64th Street Pier. The New York and Sea Beach Railroad built this complex in 1906 for ferry passenger service, but the BRT took over the terminal almost immediately for freight use. Brooklyn Army Base construction and dredging removed the ferry rack pier, created a timber bulkhead (south of Brooklyn Army Base Pier 1) through the pier site and across the slip about 1275 feet west of First Avenue, and apparently left the west face of the BRT wharf intact while filling in the north side. The Sea Beach/BRT terminal was apparently the only waterfront development on this one block frontage prior to the Brooklyn Army Base. The base property also included a triangular parcel between 64th and 65th streets, and First and Second avenues, plus a strip south of 65th Street between Second and Fourth avenues. Taken from the LIRR, the latter parcels provided a direct track link between the LIRR and the Army Base. A small concrete LIRR yardmaster's office at 65th Street and Second Avenue was retained by the Army for use as an officer's residence (Bromley 1907; Hyde 1917; Crocker 1919: 6-7; Fausser 1979; New York State Office of Parks, Recreation, and Historic Preservation 1983).

b. Original Construction, 1918-19

Construction and design contracts were issued in April 1918, and work began the following month. In a remarkable spurt of activity lasting until the armistice in November, contractors erected both warehouses, the principal upland auxiliary structures, most of Pier 4 (the northernmost) and the bulkhead north of Pier 1, and substantial portions of piers 2 and 3. Pier 1 and most of the terminal bulkheads remained unfinished, and were probably completed in 1919. In the aftermath of the wartime emergency—never actually served by the Army Base—the planned gantry cranes were not installed on Pier 1.

There were two kinds of bulkheads: a concrete relieving platform extending about 1350 feet along the waterfront from Pier 1 north; and an undocumented timber bulkhead extending about 210 feet south of Pier 1, 730 feet west of the concrete bulkhead (Figure 4). Both bulkheads reached about 5 feet above mean high water, retaining fill probably derived from excavation for the Brooklyn Army Base warehouses. The concrete bulkhead defined the waterfront for ships and lighters, while the timber bulkhead defined a railroad car storage yard at which no water access was originally intended. Crocker's detailed account of Brooklyn Army Base construction does not mention the timber bulkhead, although it was clearly within base boundaries (1919). It is possible that the LIRR or the Pennsylvania Railroad built this bulkhead in 1917, as part of the Bay Ridge development for the New York Connecting Railroad. It was probably a cribwork structure (Army Corps of Engineers 1932, 1942).

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With some exception in the handling of the concrete decks, all four Brooklyn Army Base piers exhibit construction practices common to piers built in this port by New York City, some of the railroads, and larger private terminals after c.1905-10. The New York firm Post & McCord designed Pier 1. Henry Steers, Inc., and George Spearin built the substructures and decks of Piers 2 through 4 to support two story sheds, to the designs of G. Aus Company. All four piers have concrete decks supported by wood piles and pile caps. The 18-inch-thick Pier 1 deck allowed for heavier loads than the 10-inch-thick decks of Piers 2-4. Unlike the earliest all-concrete deck piers in the port, built by the Department of Docks and Ferries beginning in 1909 with decks resting on an innovative but costly system of paired 6x12 timber clamps bolted around tenoned pile heads, these piers and several other large contemporary waterfront projects had decks resting directly on single 12x12 pile caps. The use of single pile caps marked a return to traditional wood pier construction, and a less cautious, expensive approach to concrete deck supports. Piers 2-4 also included pile-supported, reinforced concrete pedestals for shed column bases. Design of such foundations for multi-story sheds in the Port of New York pre-date the Brooklyn Army Base by perhaps a dozen years, although many earlier examples were solid fill railroad lighterage piers rather than open pile structures. The pedestals may have been cast in place, which if true was unusual without the protection of solid fill. The Army Base may also have been an early example of such foundations in open pile piers (Staniford 1914: 512-15; Crocker 1919: 52-53, Appendix C; Engineering News-Record 1919; Raber et al. 1984: 65-70)

Exposing cast-in-place concrete to sea water without the protection of solid fill may have been an emergency measure atypical of commercial projects. The pier decks and sheds have several unusual features derived from similar war-time considerations. The decks of Piers 2-4 were unusual for this port in being poured as one or two continuous slabs, rather than in sections corresponding to distances between pile bents, as was done at Pier 1 after the war. Designers here departed from common practice, which allowed for unequal settlement among bents, to save steel in reinforcing. Minimizing steel was a primary concern during a period of emergency ship construction, and is particularly apparent in the transit sheds: the longitudinal concrete stringers under the second floor concrete deck, the wood roof purlins, the use of side bay trusses instead of girders, and the cantilevered middle bay cross frames with supporting truss members and suspended girder members were very unusual in the port (Engineering News-Record 1919: 319). The same concern also appears in the lack of typical I-beam track supports in the decks of Piers 2-4, for which the designer substituted the additional piles.

The reinforced concrete warehouses include Turner system column-and-slab construction, with round, spirally reinforced columns whose diameters decreased with increasing floor heights. There was apparently no attempt made to minimize the steel required for reinforcing these enormous structures (Engineering News-Record 1919; New York State Office of Parks, Recreation, and Historic Preservation 1983).

c. Later Additions

Most post-1919 additions to the Army Base occurred during World War II, and included a new laundry building, a gate house and a guard house on the north side of the base, a marine repair shop south of Pier 1, a crane repair shop south of Warehouse B, a scale house, and oil storage sheds. Cranes were finally installed on Pier 1, as discussed below. The only notable post-1945 additions were three oil storage tanks and a pumping station, built on the southern edge of the base property in 1959. All these structures were built of concrete and/or steel. There were also a large number of small temporary sheds erected on the base at various times (New York State Office of Parks, Recreation, and Historic Preservation 1983).

C. Overview of Army Base History

The Brooklyn Army Base was first used in the return of men and matériel after World War I, but did not serve its original function as a large-scale military embarkation until World War II. Between the wars, the Army retained some of the base, including Piers 1 and 2, for its own use, but leased other areas to private shipping and warehousing firms. Most rail freight entered the base from the LIRR yard via the spur from Fourth Avenue; the link with Bush Terminal at 58th Street and First Avenue was used primarily in wartime. LIRR crews did all the train handling until 1939, when the Army created its own civilian railroad crew for the base. Thereafter regular railroad crews could normally go no further than the base entrance gate, for security reasons. When the Bay Ridge line itself was electrified in 1927, the Army erected catenary over all its own tracks. This catenary was energized at 11,000 volts AC, the standard system in use on the New Haven Railroad and later on the Pennsylvania Railroad. Thus the base was worked by electric switch engines (Army Corps of Engineers 1926, 1932; New York State Office of Parks, Recreation, and Historic Preservation 1983).

World War II was the peak period of military use at the base, which handled over three million troops and thirty-eight million tons of supplies (New York State Office of Parks, Recreation, and Historic Preservation 1983). Traffic in troop trains, transports, cargo ships, and lightered equipment was extremely heavy. Base activities included the loading of Sherman Tanks and crated tank destroyers onto cargo ships, but apparently loading of even this type of freight was done from all the piers, not just open Pier 1 (Harrison 1981: 54-6). The new Pier 1 cranes were undoubtedly installed for this type of cargo.

The Army occupied the base until 1975, using it during the Korean and Vietnam wars. Other federal agencies, including the Navy and the Post Office, also used parts of the site. It is not clear if private shipping or freight handling firms were also on site between 1945 and 1975, but several operated here between 1975 and 1981, when the Army turned the base over to the City of New York. Two city agencies have since been developing and implementing other commercial uses for the base, which has also served for emergency purposes such as temporary parking for hundreds of defective city buses (Army Corps of Engineers 1953, 1965, 1978).

Part II: Descriptive Information

A. 1988 Conditions of the Terminal and Pier 1

In general form and in somewhat deteriorated condition, the former Brooklyn Army Supply Base retains most of its original components, and appears much as it did c1945 after the addition of wartime auxiliary structures (Figure 6). The tracks between Warehouse B and Second Avenue have been removed. The upland structures, not closely inspected for this documentation, seem in generally good condition. Gradual reoccupation of the warehouses by light industrial tenants of the New York City Urban Development Corporation will probably maintain these structures. On the waterfront, the piersheds remain in excellent condition, but all pier substructures have badly deteriorated piles and Piers 2-4 have many eroded column supports. The piersheds include minor alterations, such as wood enclosures probably erected after 1945. Bridges between the piers and Warehouse A suffer from rust and leaks. The original concrete bulkhead north of Pier 1 is in generally good condition, with some erosion of the concrete and substantial deterioration of the timber fender system. Significant changes include removal of the marine repair shops south and east of Pier 1, and a fairly recent repair to the timber bulkhead south of Pier 1. The latter modification consists of the addition of a concrete relieving platform on wood piles and wood platform, tied back to sheet piling. Failure of the sheet piling has substantially weakened this common form of repair, although the newer bulkhead may be less than twenty years old (Dravo Van Houten 1984). The Cross Harbor Corporation built a pontoon-type railcar transfer bridge south of Pier 1 during the early 1980s (AERIAL VIEW.)

Part III: Sources of Information

Plans and Drawings

Army Corps of Engineers

- n.d. Plot Plan/Brooklyn Army Terminal. On file, New York City Department of Ports and Trade, Battery Maritime Building, 1 Whitehall Street, New York, NY 10004.

Historic Views

Published and unpublished aerial views of the Brooklyn Army Base are probably fairly widespread, although the relative lack of superficial change at the complex means that such views do not add much to historical understanding. A good, if small-scale, published view taken shortly after the base was completed appears in Army Corps of Engineers 1926 and 1932.

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- 1912 The New South Brooklyn Freight Terminal, New York Harbor. Engineering News 67: 421-29.

Likely Sources Not Yet Investigated

Original Department of the Army archives are the principal source not explored for this documentation, and might provide original drawings, as well as more information on original design or planning considerations, or on later terminal use. Other contemporary architectural and engineering journal articles may have additional photographs, although probably little more descriptive data than the sources cited above.

BROOKLYN ARMY SUPPLY BASE
 (Brooklyn Military Ocean Terminal)
 (Brooklyn Army Terminal)
 HAER No. NY-202 (Page 15)

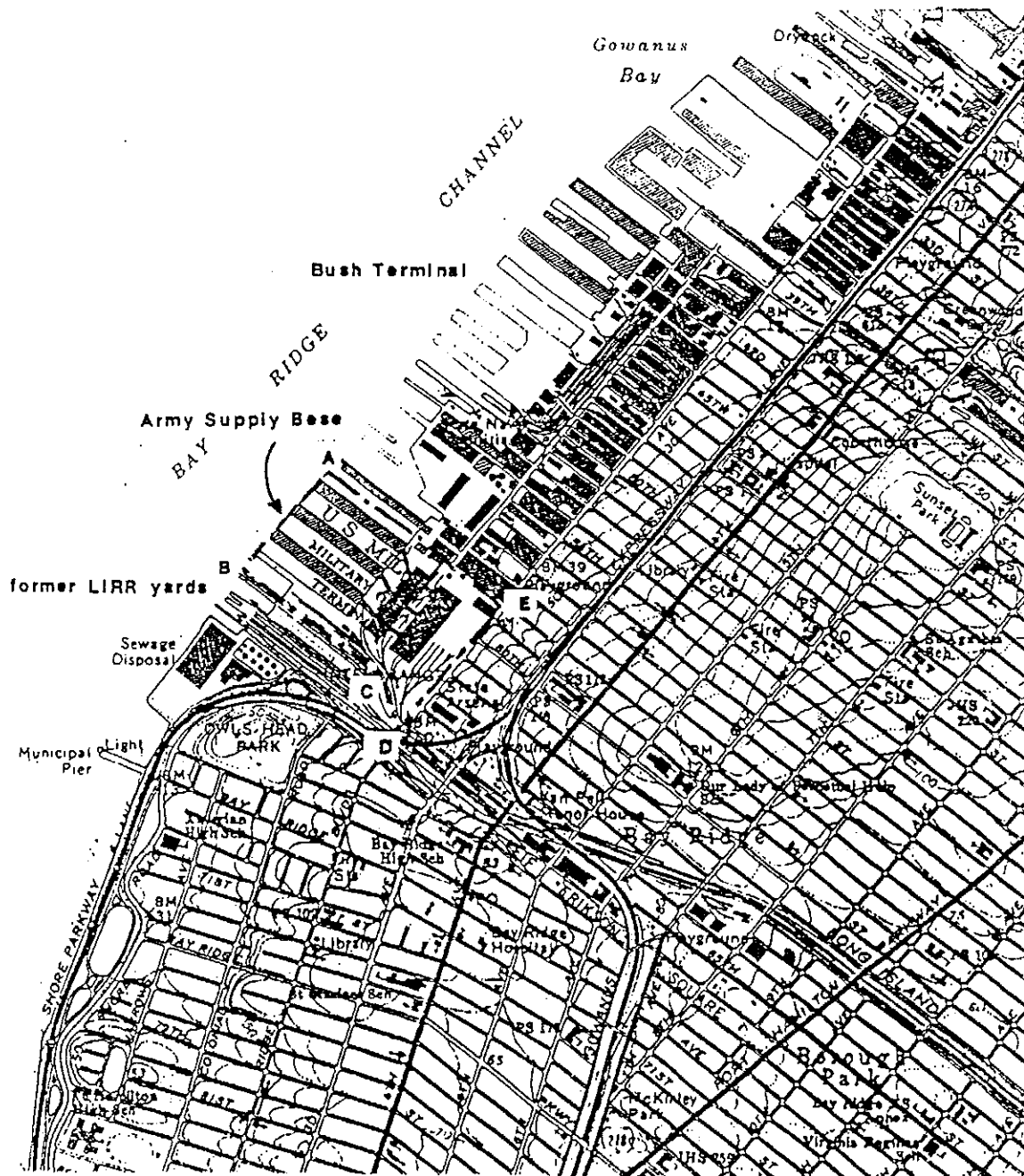


Figure 1. BROOKLYN ARMY BASE LOCATION ON THE BROOKLYN WATERFRONT
 base map: Jersey City U.S.G.S. quadrangle sheet
 UTM references for points A through E appear on page 1

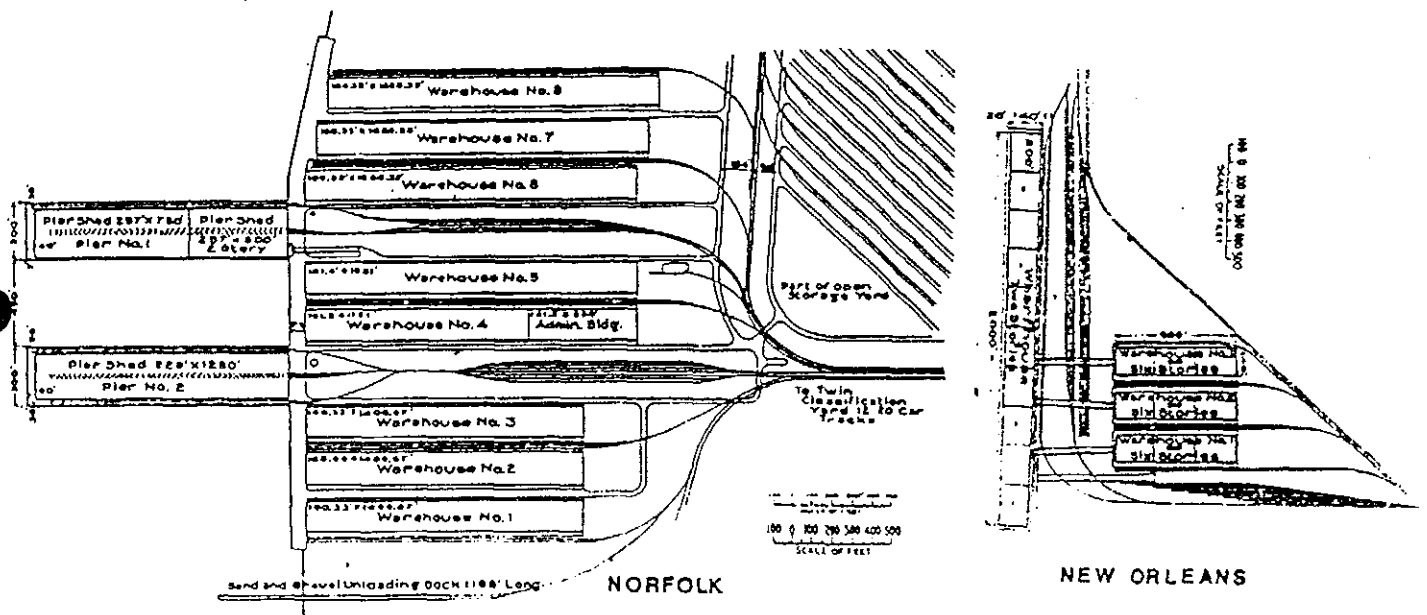


Figure 2. PLANS OF THE NORFOLK AND NEW ORLEANS ARMY SUPPLY BASES
 source: MacElwee 1926

BROOKLYN ARMY SUPPLY BASE
(Brooklyn Military Ocean Terminal)
(Brooklyn Army Terminal)
HAER No. NY-202 (Page 17)

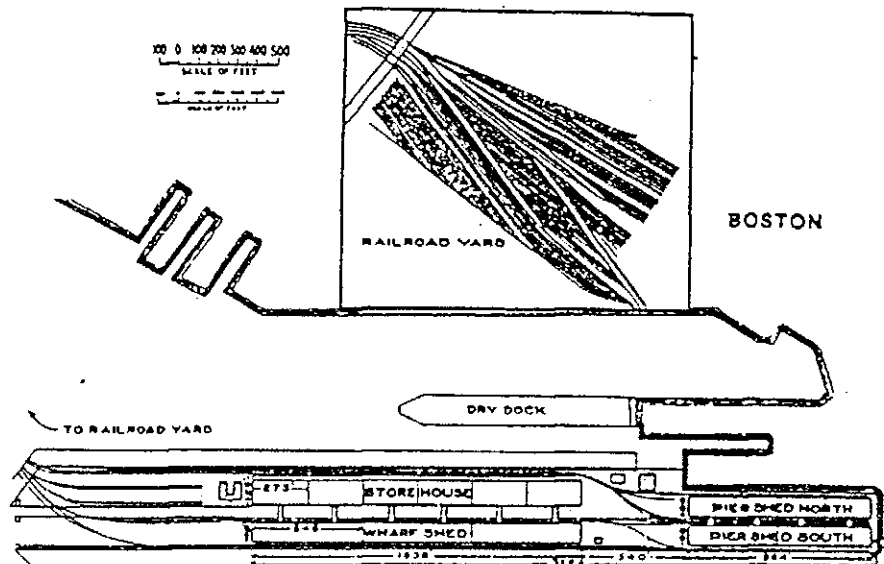
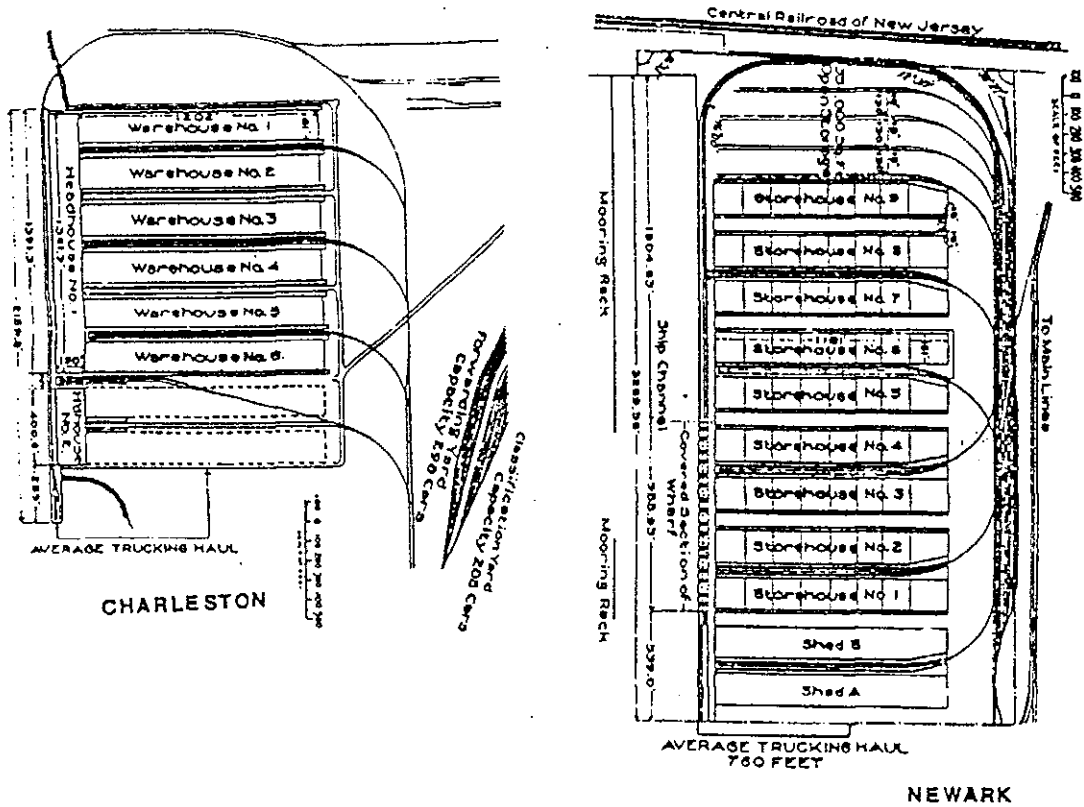


Figure 3. PLANS OF THE CHARLESTON, NEWARK, AND BOSTON ARMY SUPPLY BASES
source: MacElwee 1926 (n.b. Philadelphia base plan not available)

BROOKLYN ARMY SUPPLY BASE
 (Brooklyn Military Ocean Terminal)
 (Brooklyn Army Terminal)
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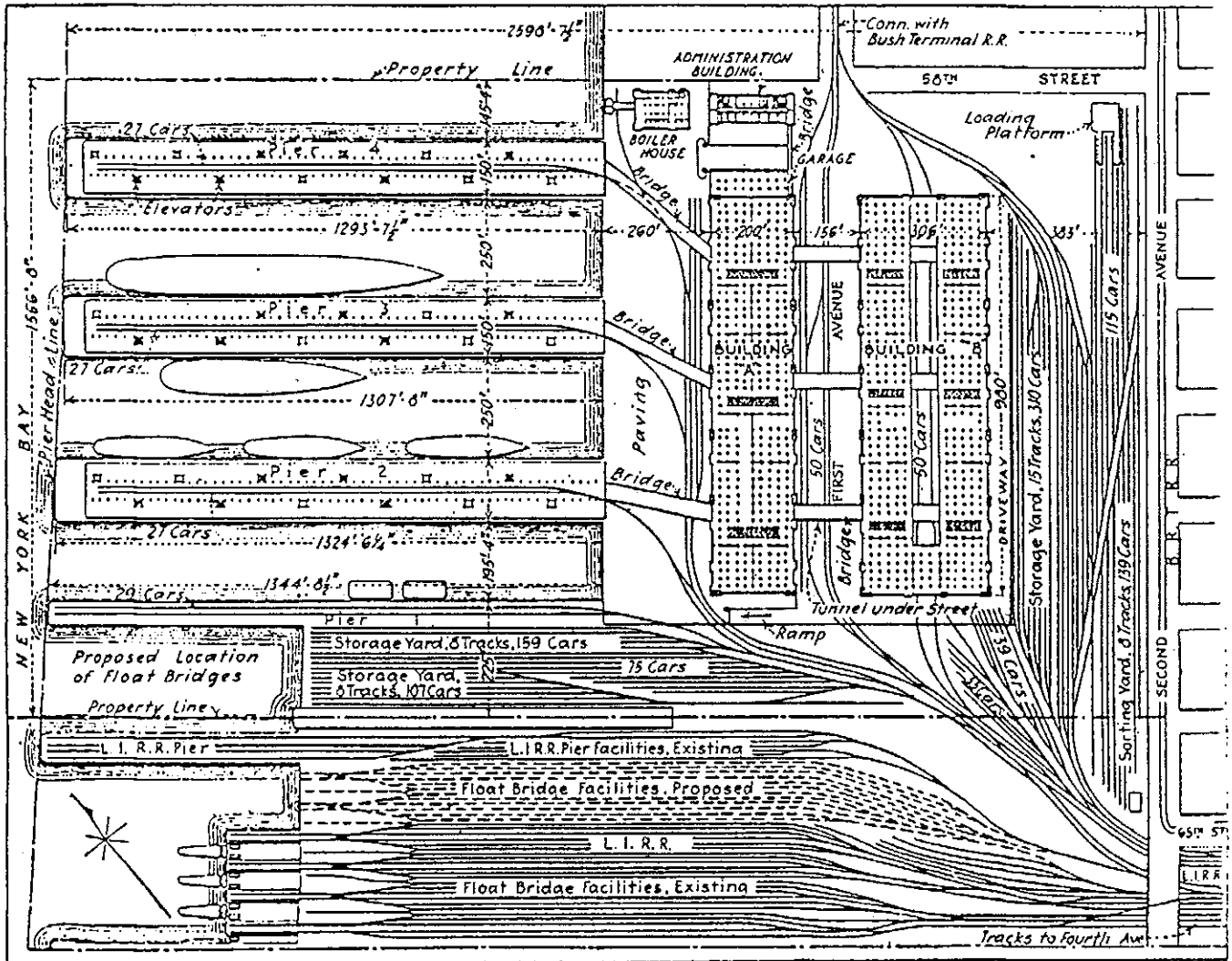


Figure 4. PLAN OF THE BROOKLYN ARMY SUPPLY BASE c1919
 source: Engineering News-Record 1919

BROOKLYN ARMY SUPPLY BASE
 (Brooklyn Military Ocean Terminal)
 (Brooklyn Army Terminal)
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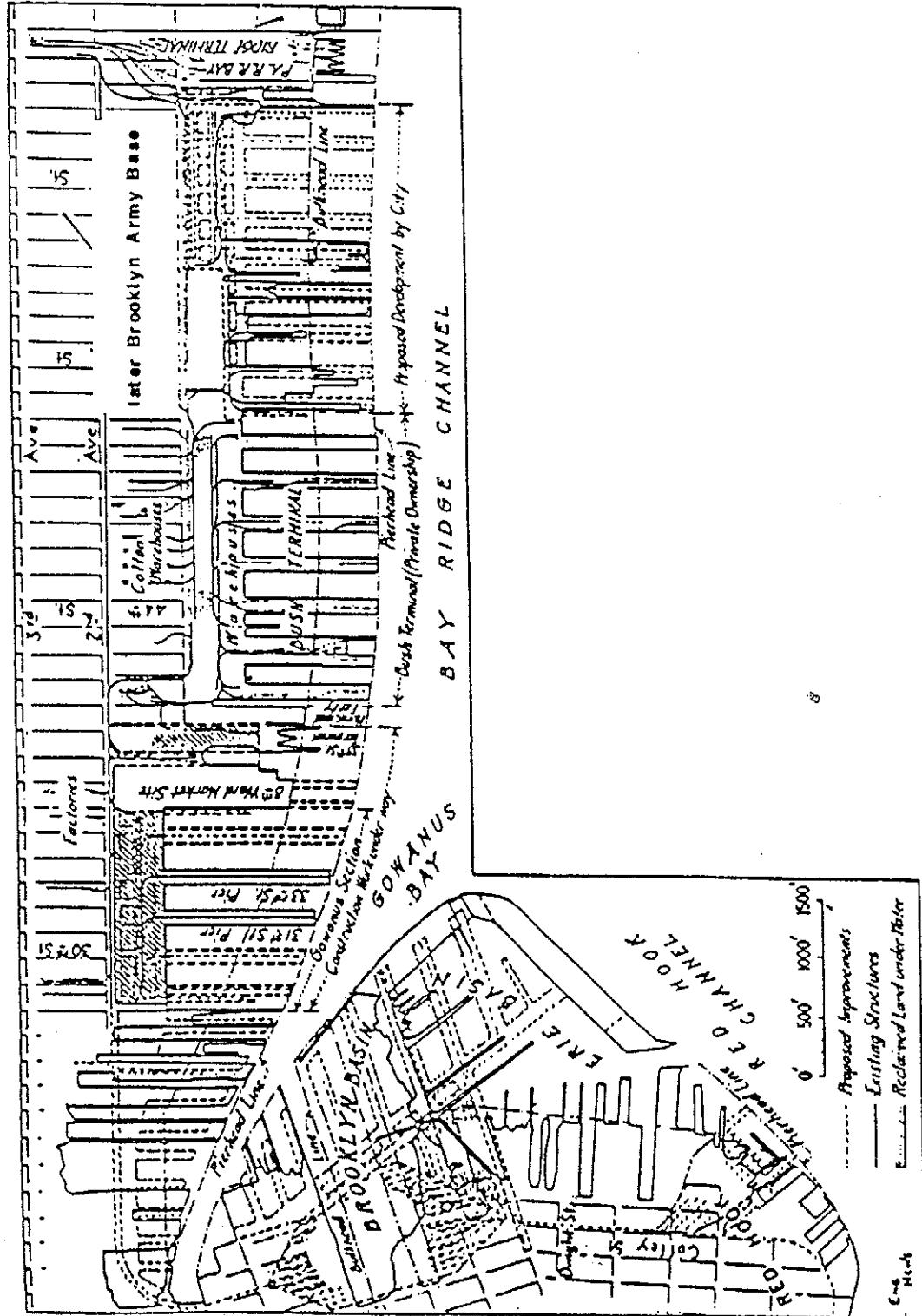


Figure 5. SOUTH BROOKLYN MUNICIPAL WATERFRONT PLAN, PROJECTED IN 1906
 source: Staniford and Guise 1912

BROOKLYN ARMY SUPPLY BASE
 (Brooklyn Military Ocean Terminal)
 (Brooklyn Army Terminal)
 HAER No. NY-202 (Page 20)

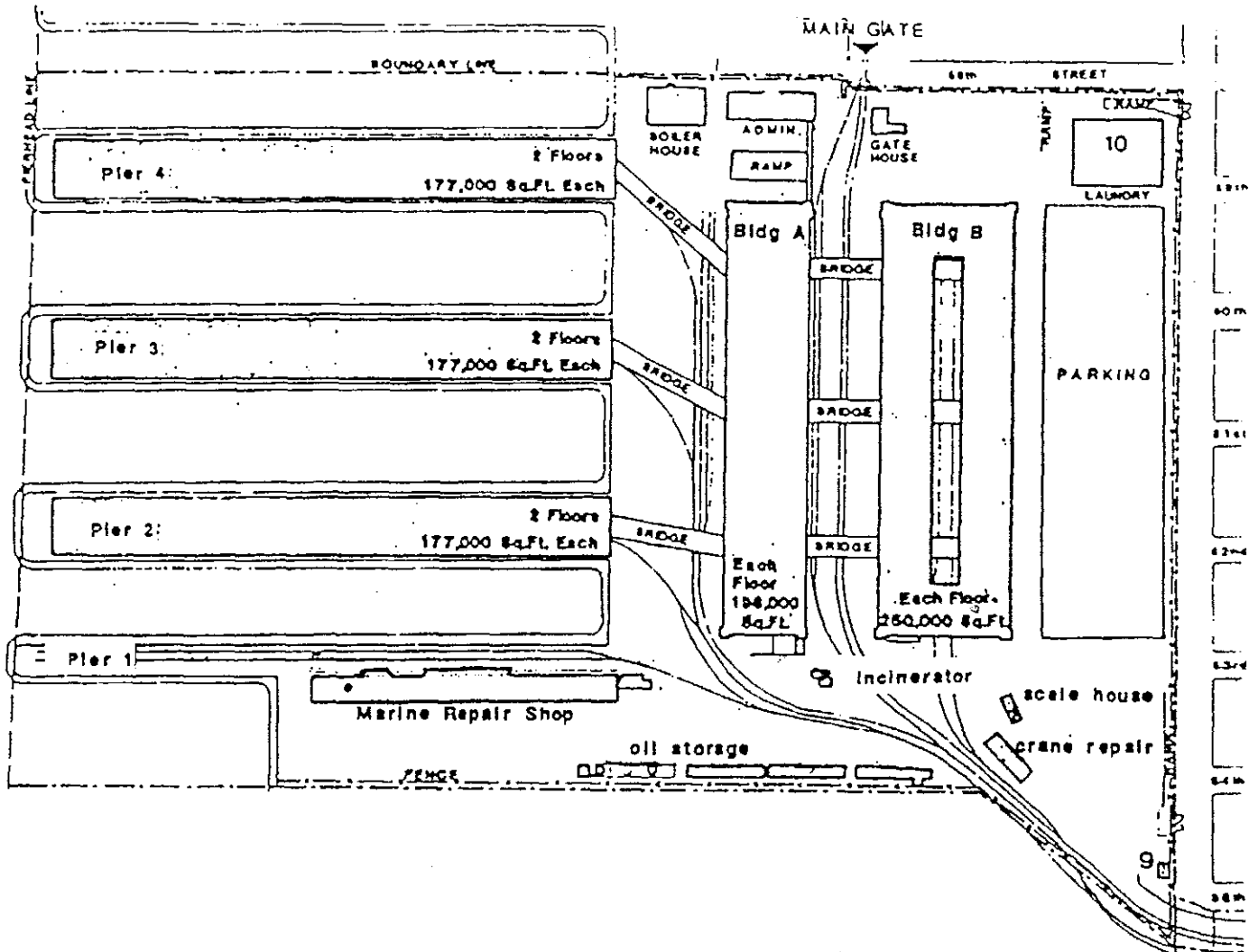


Figure 6. BROOKLYN ARMY SUPPLY BASE c1975, WITH PRINCIPAL POST-1920 ADDITIONS